An extension of time and a Notice of Appeal from the Final Office Action dated April 22, 2003, with appropriate fees, are being filed concurrently.

Please amend the application as follows:

Amendments to the Claims

Please cancel Claims 1 and 16. Please amend Claims 2, 6-9, 12-15, 17, 20-23, 26, 29, 30, 32, and 34. Please add new Claims 35-58. The Claim Listing below will replace all prior versions of the claims in the application:

Claim Listing

1. (Canceled)

2. (Currently Amended) An apparatus as in Claim ~~1~~ 4 wherein the coupling between the input port and output port is provided by a branch line having the desired characteristic input/output impedance.

3. (Original) An apparatus as in Claim 2 wherein the coupling between the quadrature ports is provided by a branch line having the desired characteristic quadrature port impedance.

4. (Previously presented) A phase shifter circuit for imparting a phase shift to an input signal applied at an input port such that a phase shifted signal appears at an output port, the circuit comprising:

an input port coupled to receive the input signal;

an output port coupled to provide the phase shifted output signal, the output port coupled to the input port by coupled lines, such coupling between the input port and output port having a characteristic input/output impedance;

a first quadrature port and a second quadrature port, the first and second quadrature ports coupled to one another, such coupling between quadrature ports having a characteristic quadrature port impedance, being different from the input/output port impedance;

a first impedance transformer coupled between the input port and a first one of the quadrature ports, the first impedance transformer transforming the characteristic

input/output impedance across the input/output ports to the characteristic quadrature port impedance across the quadrature ports; and

a second impedance transformer coupled between a second one of the quadrature ports and the output port, the second impedance transformer transforming the characteristic quadrature port impedance across the quadrature ports to the characteristic input/output impedance.

5. (Previously presented) A phase shifter circuit for imparting a phase shift to an input signal applied at an input port such that a phase shifted signal appears at an output port, the circuit comprising:

an input port coupled to receive the input signal;

an output port coupled to provide the phase shifted output signal, the output port coupled to the input port, such coupling between the input port and output port having a characteristic input/output impedance;

a first quadrature port and a second quadrature port, the first and second quadrature ports coupled to one another by coupled lines, such coupling between quadrature ports having a characteristic quadrature port impedance, being different from the input/output port impedance;

a first impedance transformer coupled between the input port and a first one of the quadrature ports, the first impedance transformer transforming the characteristic input/output impedance across the input/output ports to the characteristic quadrature port impedance across the quadrature ports; and

a second impedance transformer coupled between a second one of the quadrature ports and the output port, the second impedance transformer transforming the characteristic quadrature port impedance across the quadrature ports to the characteristic input/output impedance.

6. (Currently Amended) An apparatus as in Claim ~~1~~ 4 wherein the first impedance transformer is implemented as a one-quarter wavelength section of transmission line.

7. (Currently Amended) An apparatus as in Claim ~~1~~ 4 wherein the second impedance transformer is implemented as a one-quarter wavelength section of transmission line.

8. (Currently Amended) An apparatus as in Claim ~~1~~ 4 wherein at least one varactor diode is coupled to at least one quadrature port.

9. (Currently Amended) An apparatus as in Claim ~~1~~ 4 wherein at least one varactor diode is coupled to each of the quadrature ports.

10. (Previously presented) An apparatus as in Claim 9 wherein an input bias voltage is applied to at least one of the varactor diodes.

11. (Previously presented) An apparatus as in Claim 10 wherein the voltage of the input bias voltage determines an amount of phase shift imparted by the phase shifter.

12. (Currently Amended) An apparatus as in Claim ~~1~~ 4 wherein the characteristic input/output impedance is 50 ohms.

13. (Currently Amended) An apparatus as in Claim ~~1~~ 4 wherein the characteristic quadrature port impedance is 20 ohms.

14. (Currently Amended) An apparatus as in Claim ~~1~~ 4 wherein a Radio Frequency (RF) choke is applied between a bias voltage port and one of the quadrature ports.

15. (Currently Amended) An apparatus as in Claim ~~1~~ 4 wherein the characteristic quadrature port impedance is lower than the characteristic input/output port impedance.

16. (Canceled)

17. (Currently Amended) A method as in Claim ~~16~~ 19 wherein the coupling between the input port and output port is provided by a branch line having the desired characteristic input/output impedance.

18. (Previously Presented) A method as in Claim 17 wherein the coupling between the quadrature ports is provided by a branch line having the desired characteristic quadrature port impedance.

19. (Previously presented) A method for imparting a phase shift to an input signal applied at an input port such that a phase shifted signal appears at an output port, the method comprising the steps of:

receiving the input signal at an input port;

providing the phase shifted output signal at an output port, the output port coupled to the input port by coupled lines, such coupling between the input port and output port having a characteristic input/output impedance;

coupling a first quadrature port to a second quadrature port, such coupling between quadrature ports having a characteristic quadrature port impedance, being different from the input/output port impedance;

coupling a first impedance transformer between the input port and a first one of the quadrature ports, the first impedance transformer transforming the characteristic input/output impedance across the input/output ports to the characteristic quadrature port impedance across the quadrature ports; and

coupling a second impedance transformer between a second one of the quadrature ports and the output port, the second impedance transformer transforming the characteristic quadrature port impedance across the quadrature ports to the characteristic input/output impedance.

20. (Currently Amended) A method as in Claim ~~16~~ 19 wherein the coupling between the quadrature ports is provided by coupled lines.

21. (Currently Amended) A method as in Claim ~~16~~ 19 wherein the first impedance transformer is implemented as a one-quarter wavelength section of transmission line.

22. (Currently Amended) A method as in Claim ~~16~~ 19 wherein the second impedance transformer is implemented as a one-quarter wavelength section of transmission line.

23. (Currently Amended) A method as in Claim ~~16~~ 19 wherein at least one varactor diode is coupled to at least one quadrature port.

24. (Previously Presented) A method as in Claim 23 wherein an input bias voltage is applied to at least one of the varactor diodes.

25. (Previously Presented) A method as in Claim 24 wherein the voltage of the input bias voltage determines an amount of phase shift imparted by the phase shifter.

26. (Previously Presented) A method as in Claim ~~16~~ 19 wherein at least one varactor diode is coupled to each of the quadrature ports.

27. (Previously Presented) A method as in Claim 26 wherein an input bias voltage is applied to at least one of the varactor diodes.

28. (Previously Presented) A method as in Claim 27 wherein the voltage of the input bias voltage determines an amount of phase shift imparted by the phase shifter.

29. (Currently Amended) A method as in Claim ~~16~~ 19 wherein the characteristic input/output impedance is 50 ohms.

30. (Currently Amended) A method as in Claim ~~16~~ 19 wherein the characteristic quadrature port impedance is 20 ohms.

31. (Previously presented) A method for imparting a phase shift to an input signal applied at an input port such that a phase shifted signal appears at an output port, the method comprising the steps of:

receiving the input signal at an input port;

providing the phase shifted output signal at an output port, the output port coupled to the input port, such coupling between the input port and output port having a characteristic input/output impedance;

coupling a first quadrature port to a second quadrature port, such coupling between quadrature ports having a characteristic quadrature port impedance, being different from the input/output port impedance;

coupling a first impedance transformer between the input port and a first one of the quadrature ports, the first impedance transformer transforming the characteristic input/output impedance across the input/output ports to the characteristic quadrature port impedance across the quadrature ports;

coupling a second impedance transformer between a second one of the quadrature ports and the output port, the second impedance transformer transforming the

characteristic quadrature port impedance across the quadrature ports to the characteristic input/output impedance; and

applying a Radio Frequency (RF) choke between a bias voltage port and one of the quadrature ports.

32. (Currently Amended) A method as in Claim ~~16~~ 19 wherein the characteristic quadrature port impedance is lower than the characteristic input/output port impedance.

33. (Previously presented) A phase shifter circuit for imparting a phase shift to an input signal applied at an input port such that a phase shifted signal appears at an output port, the circuit comprising:

an input port coupled to receive the input signal;

an output port coupled to provide the phase shifted output signal, the output port coupled to the input port, such coupling between the input port and output port having a characteristic input/output impedance;

a first quadrature port and a second quadrature port, the first and second quadrature ports coupled to one another, such coupling between quadrature ports having a characteristic quadrature port impedance, being different from the input/output port impedance;

a first impedance transformer coupled between the input port and a first one of the quadrature ports, the first impedance transformer transforming the characteristic input/output impedance across the input/output ports to the characteristic quadrature port impedance across the quadrature ports;

a second impedance transformer coupled between a second one of the quadrature ports and the output port, the second impedance transformer transforming the characteristic quadrature port impedance across the quadrature ports to the characteristic input/output impedance; and

at least one varactor diode is coupled to at least one quadrature port, wherein an input bias voltage is applied to at least one of the varactor diodes.

34. (Currently Amended) An apparatus as in Claim [8] 35 wherein the voltage of the input bias voltage determines an amount of phase shift imparted by the phase shifter.

35. (New) An apparatus as in Claim 8 wherein an input bias voltage is applied to the at least one varactor diode.

36. (New) An apparatus as in Claim 5 wherein the coupling between the input port and output port is provided by a branch line having the desired characteristic input/output impedance.

37. (New) An apparatus as in Claim 36 wherein the coupling between the quadrature ports is provided by a branch line having the desired characteristic quadrature port impedance.

38. (New) An apparatus as in Claim 5 wherein the first impedance transformer is implemented as a one-quarter wavelength section of transmission line.

39. (New) An apparatus as in Claim 5 wherein the second impedance transformer is implemented as a one-quarter wavelength section of transmission line.

40. (New) An apparatus as in Claim 5 wherein at least one varactor diode is coupled to at least one quadrature port.

41. (New) An apparatus as in Claim 40 wherein an input bias voltage is applied to at least one of the varactor diodes.

42. (New) An apparatus as in Claim 41 wherein the voltage of the input bias voltage determines an amount of phase shift imparted by the phase shifter.

43. (New) An apparatus as in Claim 5 wherein at least one varactor diode is coupled to each of the quadrature ports.

44. (New) An apparatus as in Claim 43 wherein an input bias voltage is applied to at least one of the varactor diodes.

45. (New) An apparatus as in Claim 44 wherein the voltage of the input bias voltage determines an amount of phase shift imparted by the phase shifter.

46. (New) An apparatus as in Claim 5 wherein the characteristic input/output impedance is 50 ohms.

47. (New) An apparatus as in Claim 5 wherein the characteristic quadrature port impedance is 20 ohms.

48. (New) An apparatus as in Claim 5 wherein a Radio Frequency (RF) choke is applied between a bias voltage port and one of the quadrature ports.

49. (New) An apparatus as in Claim 5 wherein the characteristic quadrature port impedance is lower than the characteristic input/output port impedance.

50. (New) An apparatus as in Claim 33 wherein the coupling between the input port and output port is provided by a branch line having the desired characteristic input/output impedance.

51. (New) An apparatus as in Claim 50 wherein the coupling between the quadrature ports is provided by a branch line having the desired characteristic quadrature port impedance.

52. (New) An apparatus as in Claim 33 wherein the first impedance transformer is implemented as a one-quarter wavelength section of transmission line.

53. (New) An apparatus as in Claim 33 wherein the second impedance transformer is implemented as a one-quarter wavelength section of transmission line.

54. (New) An apparatus as in Claim 53 wherein the voltage of the input bias voltage determines an amount of phase shift imparted by the phase shifter.

55. (New) An apparatus as in Claim 33 wherein the characteristic input/output impedance is 50 ohms.

56. (New) An apparatus as in Claim 33 wherein the characteristic quadrature port impedance is 20 ohms.

57. (New) An apparatus as in Claim 33 wherein a Radio Frequency (RF) choke is applied between a bias voltage port and one of the quadrature ports.

58. (New) An apparatus as in Claim 33 wherein the characteristic quadrature port impedance is lower than the characteristic input/output port impedance.